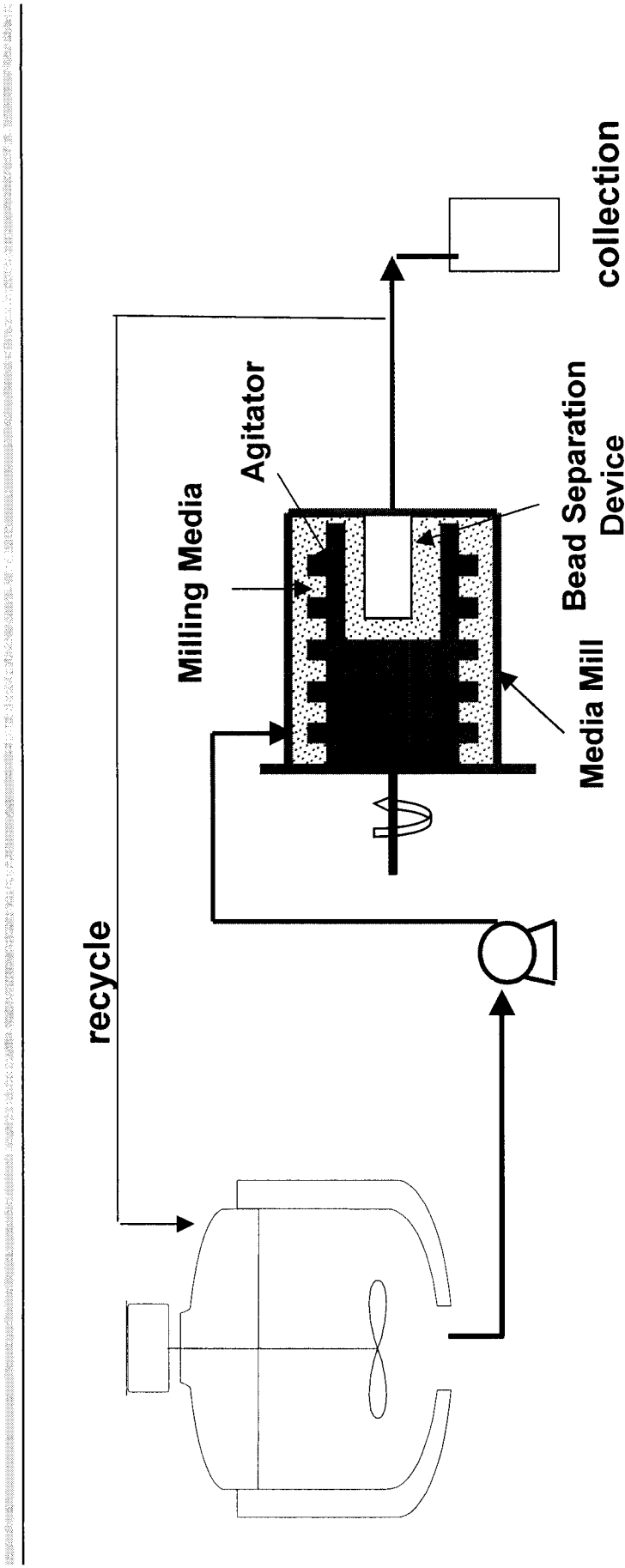


Figure 1



Media Milling set up: Figure demonstrates the typical components for a media milling in recycle mode. This includes in order: blending vessel, fluid pump, media mill, and recycle line back to the vessel. Single pass milling does not recycle and simply feeds the product into a collection receiver through the mill. In single pass mode the pump can be replaced by a pressure transfer from the still. Multiple single passes can accomplish a similar product profile as the recycle mode

Figure 2

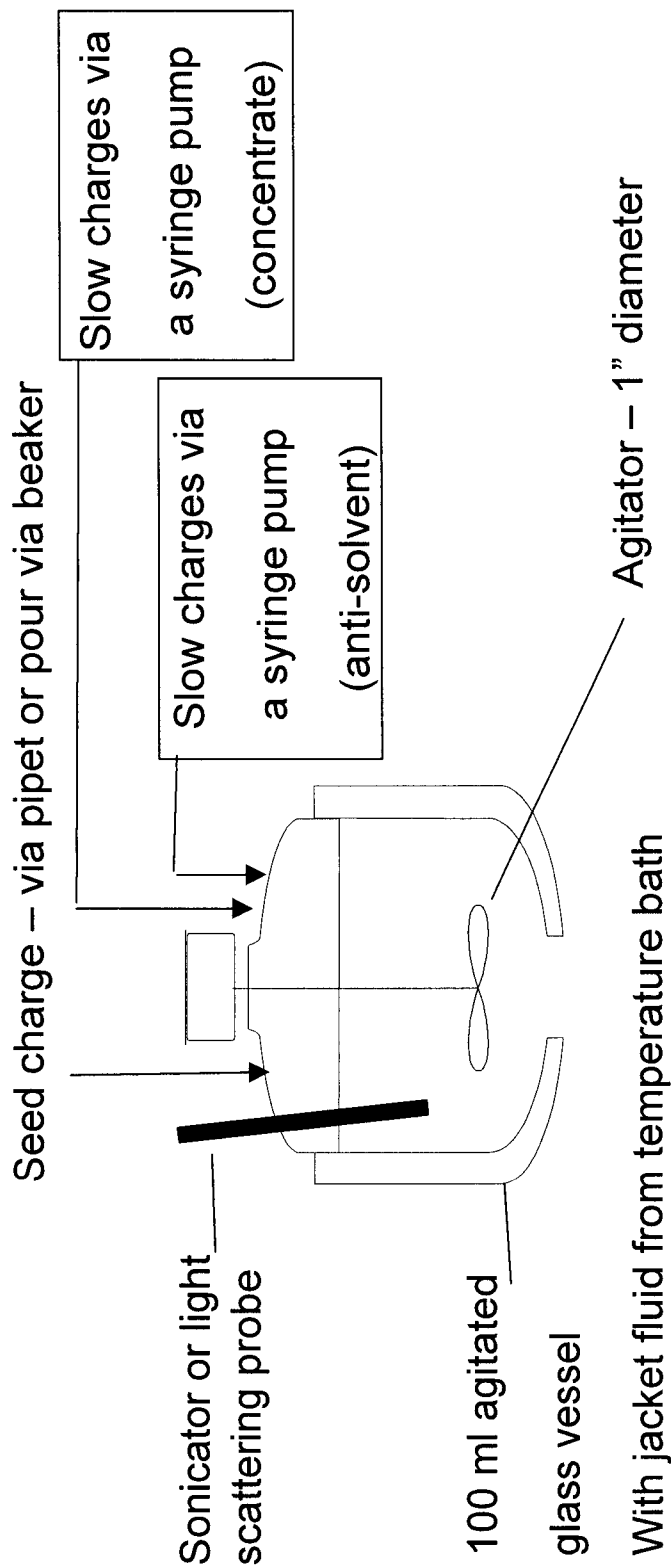


Figure demonstrates a crystallization vessel set up for examples 1 -7 and 9. In Example 1, the antisolvent was charge rapidly < 10 seconds in portions using a syringe with a needle. Optionally a sonicator probe and or a light scattering probe can be added.

Figure 3

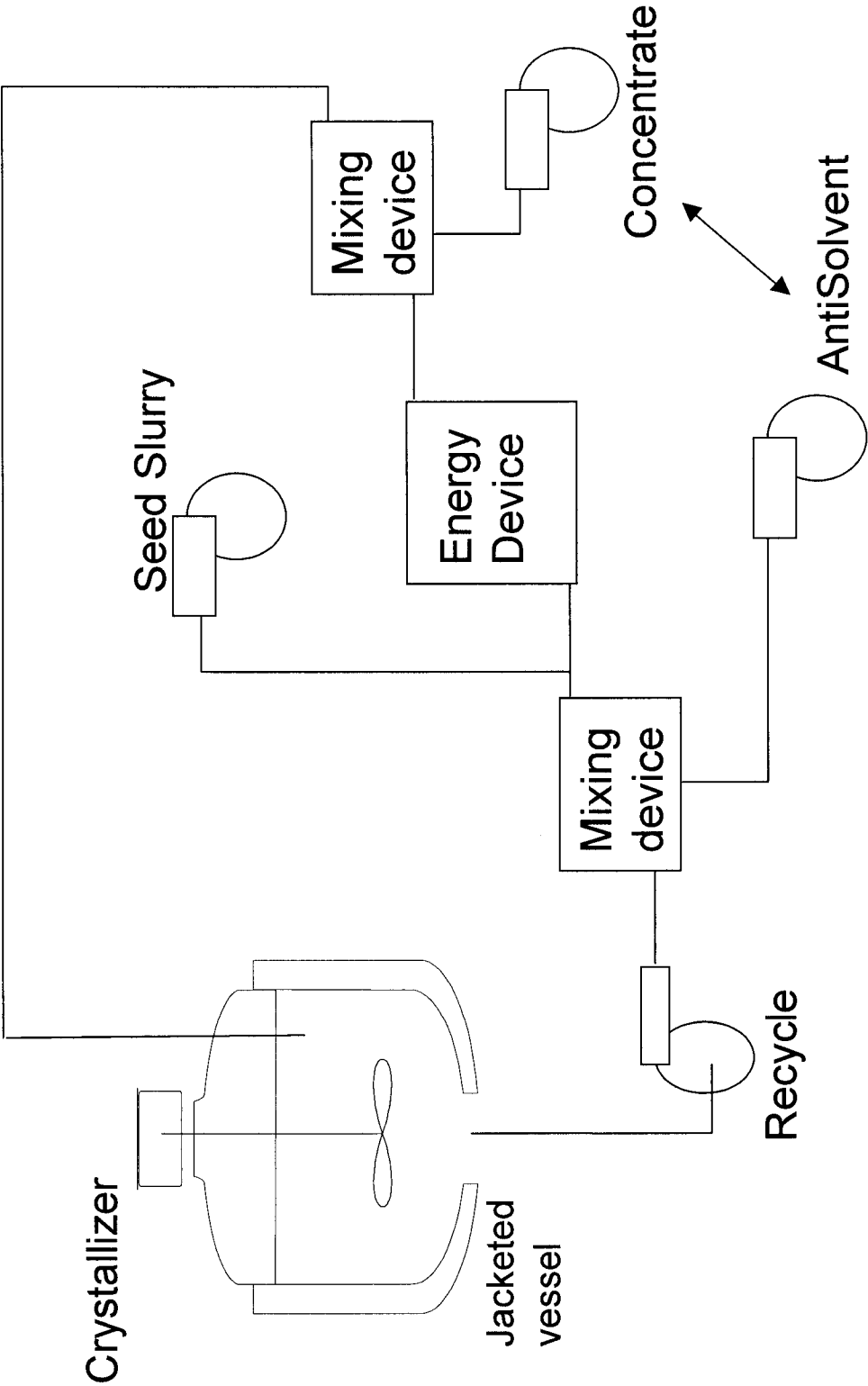


Figure 3 displays an example set-up which was shown amenable for scale up of the micro-milling and crystallization process as in Examples 10, 11, and 12. The crystallization vessel and components of the recycle loop are presented.

Recycle loop in laboratory

Figure 4

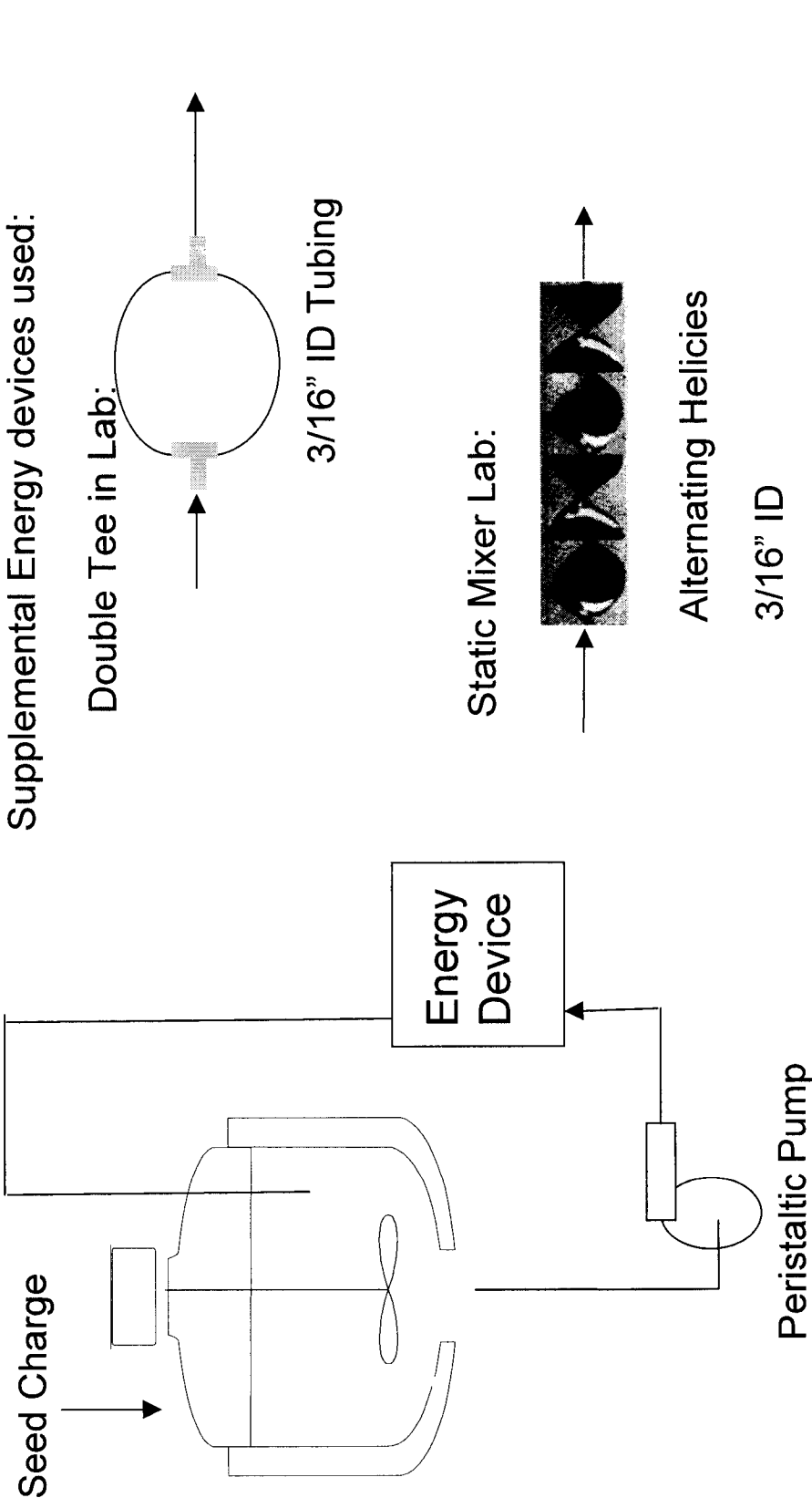
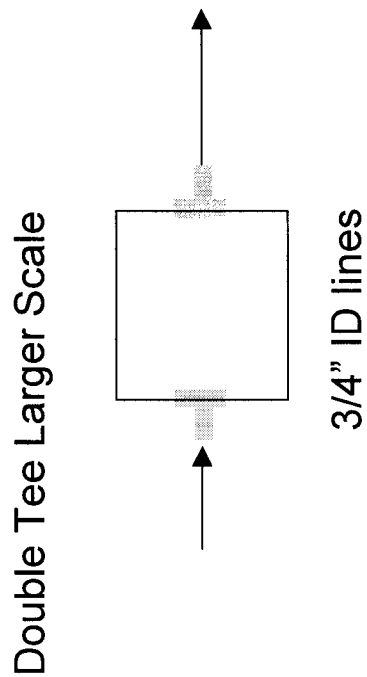


Figure 5



Double Tee supplemental energy device used in Example 11. Lines are made of $\frac{3}{4}$ " ID steel pipe with sharp right angle turns. The streams impinge at the outlet.

Figure 6

Crystallization

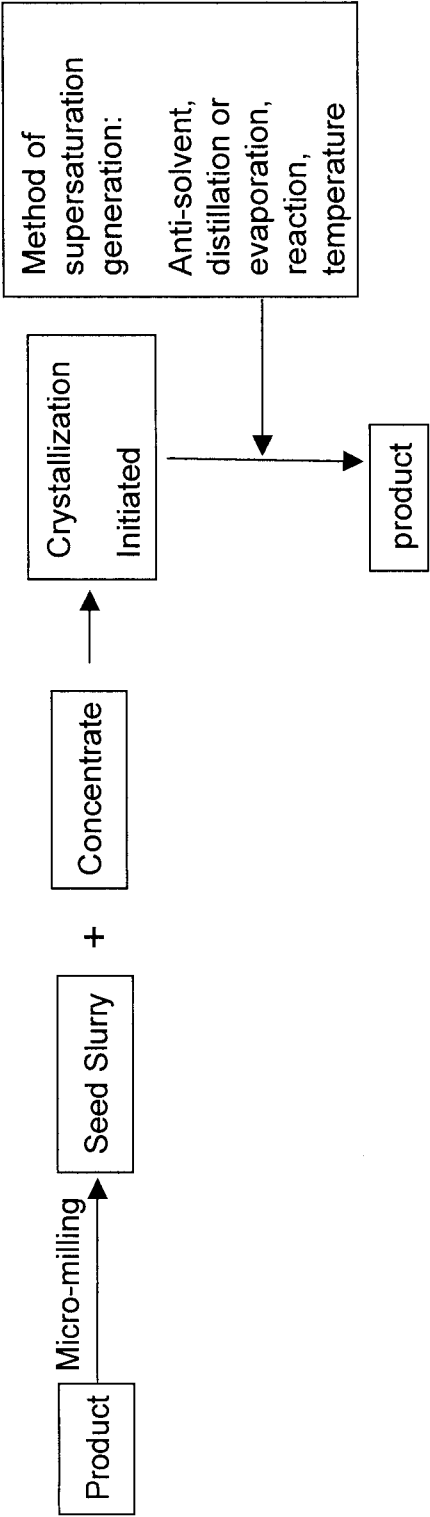


Figure 7

Batch Crystallization

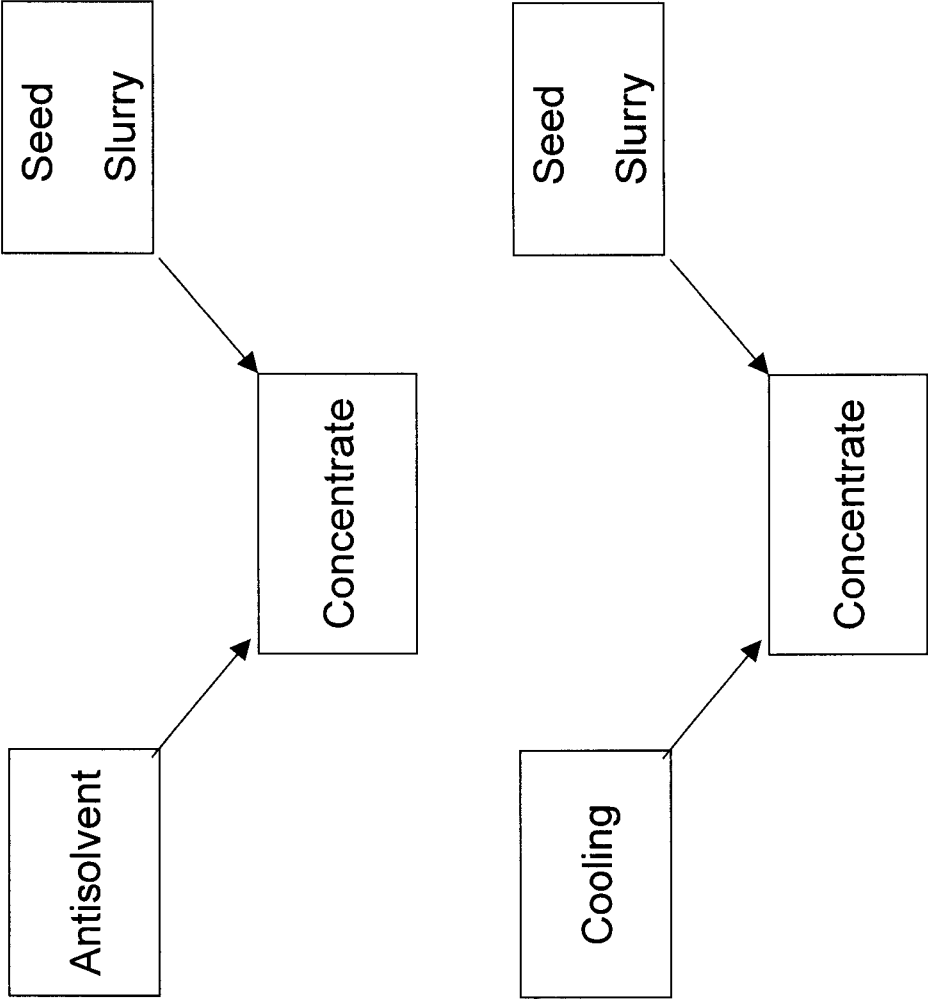


Figure 8

Semi-continuous Crystallization

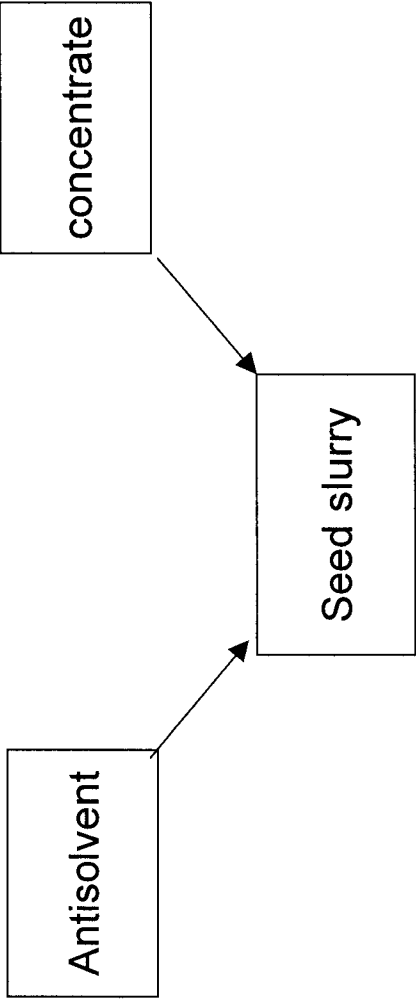


Figure 9

Batch Reactive Crystallization

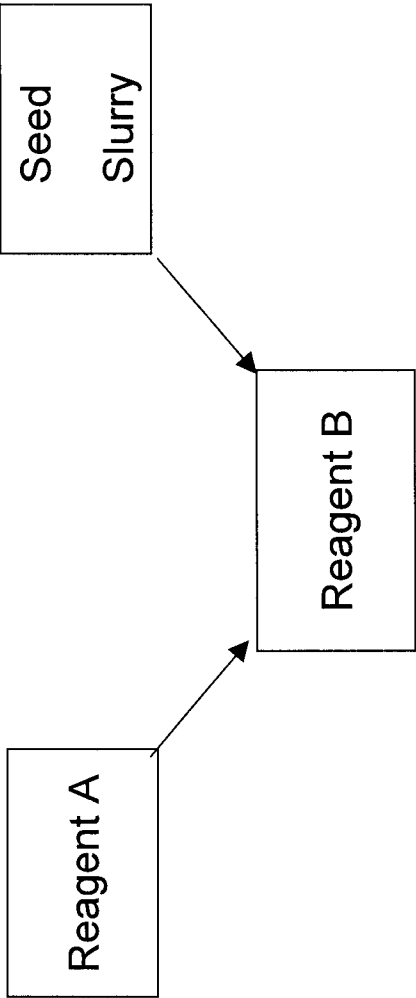


Fig 10:
Micrograph of example 1B – the scale bar represents 10 μ m

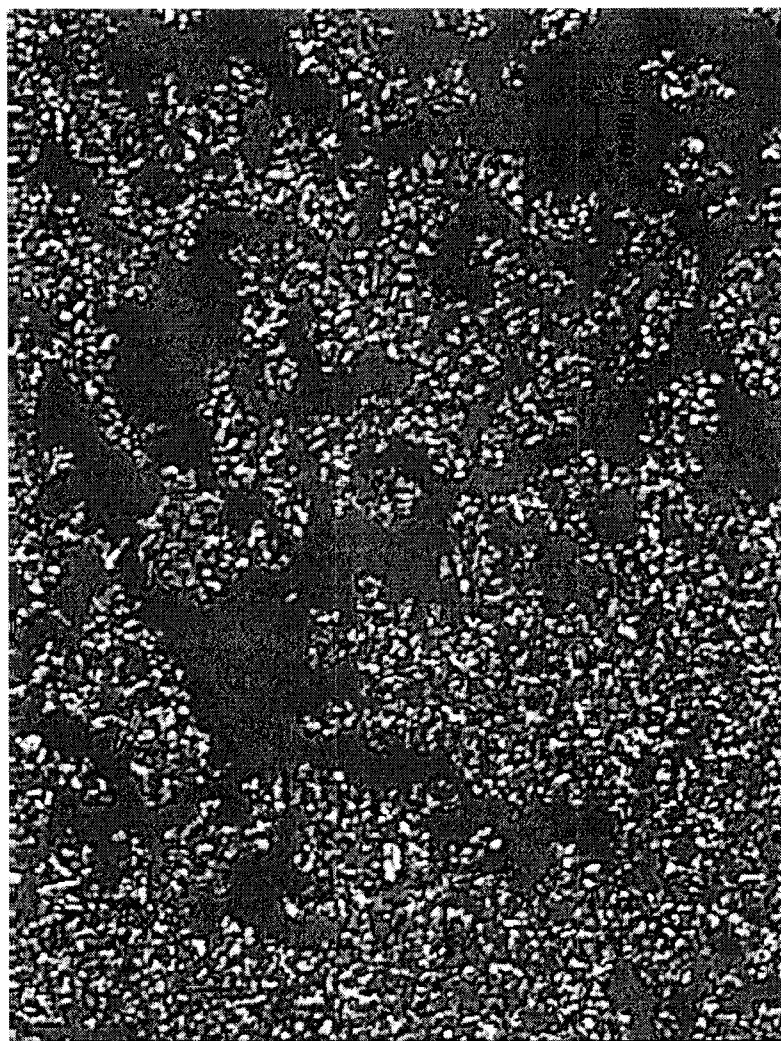


Fig 11: Example 3B
0.5 minutes of recycle milling

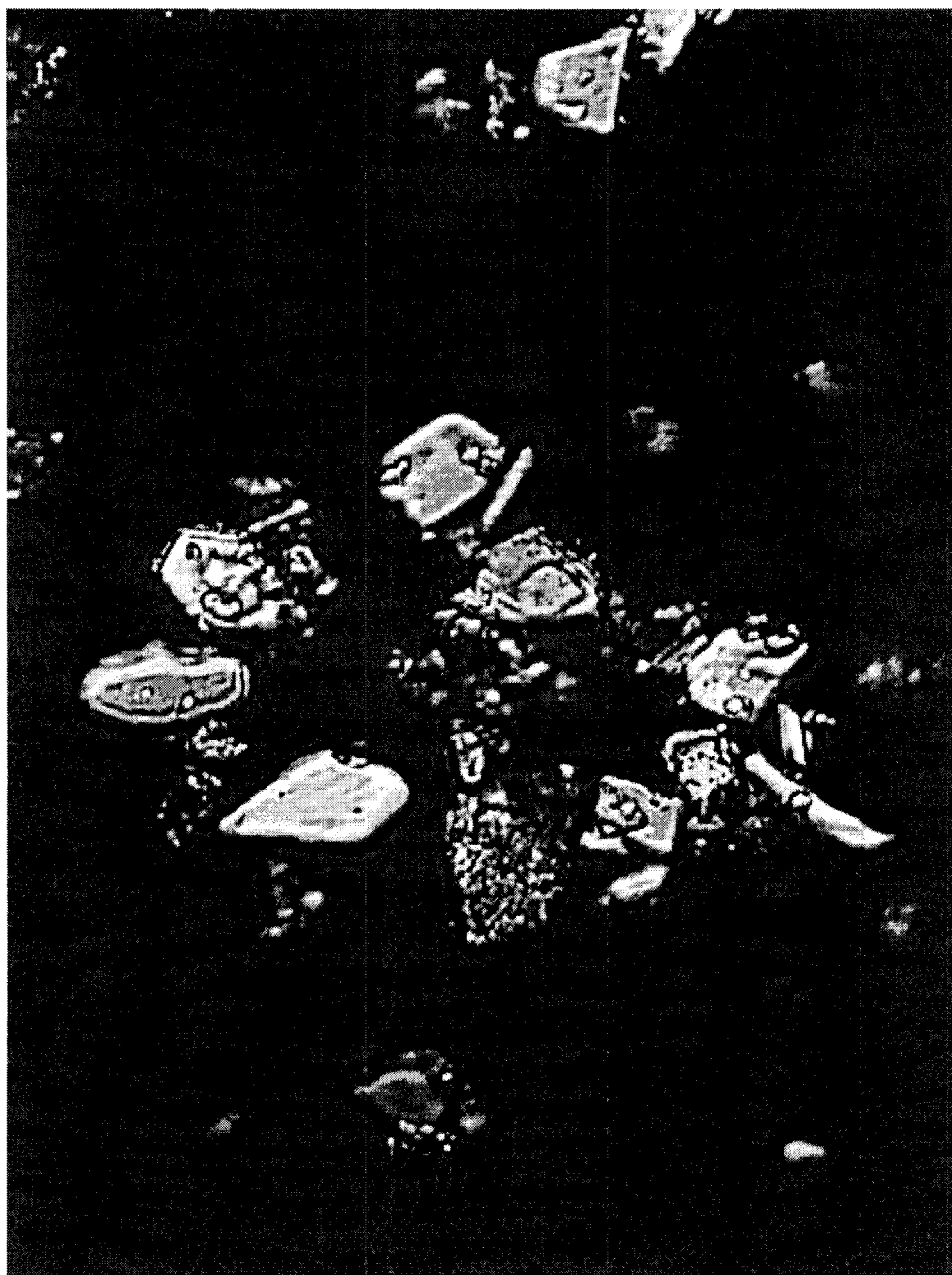


Fig 12 milled 15 minutes

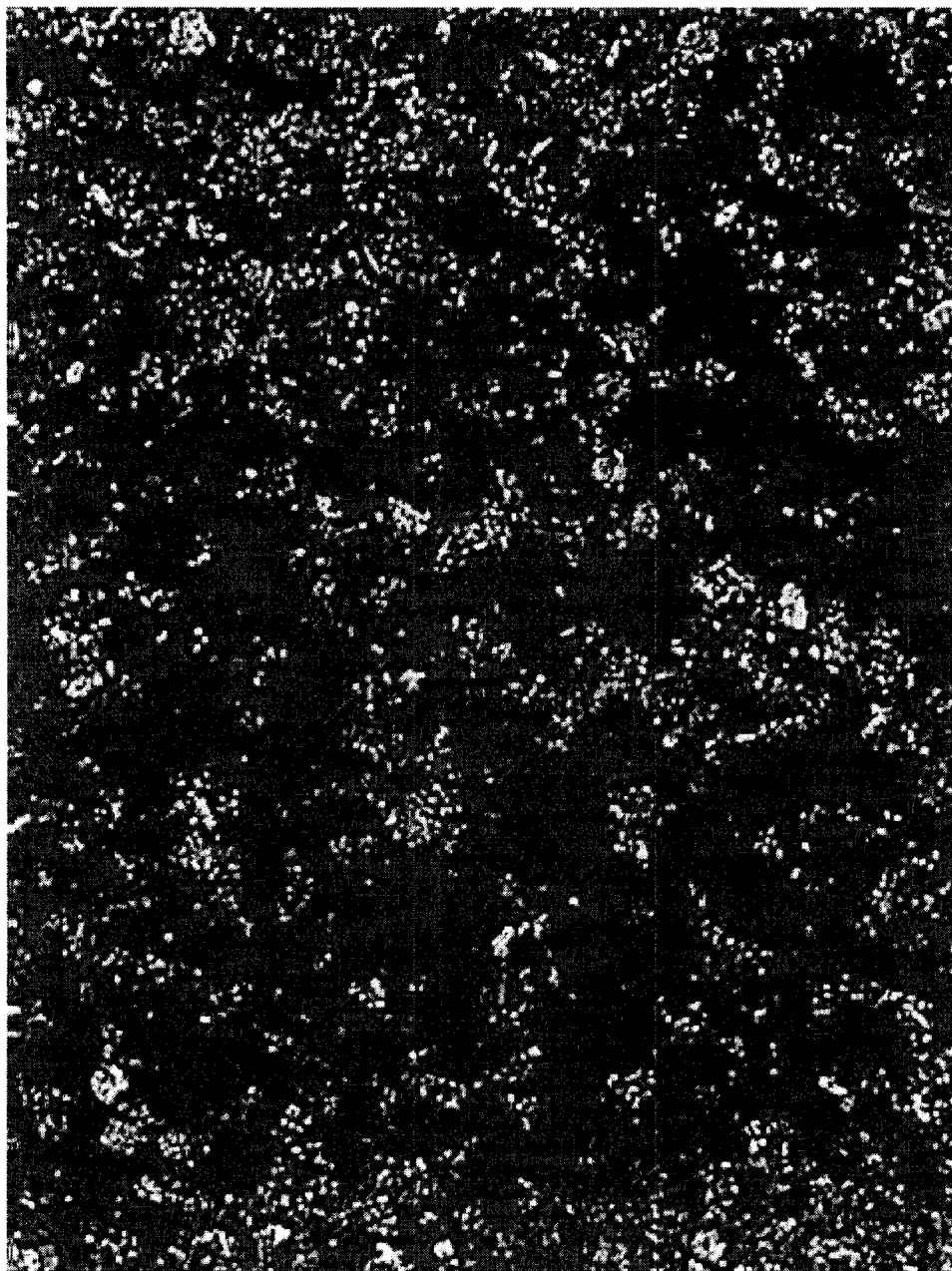


Fig 13 milled 60 minutes



Fig 14 final product run 3B

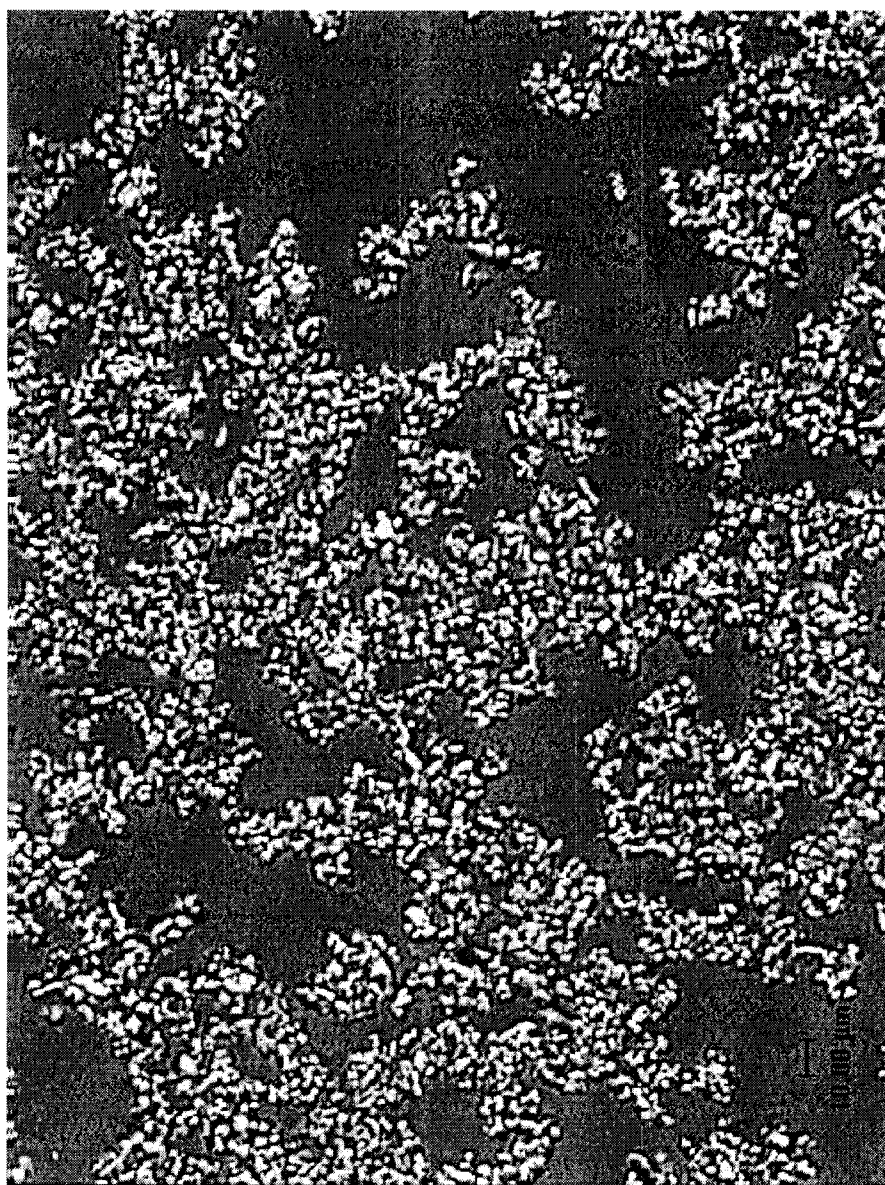


Fig 15 4B picture

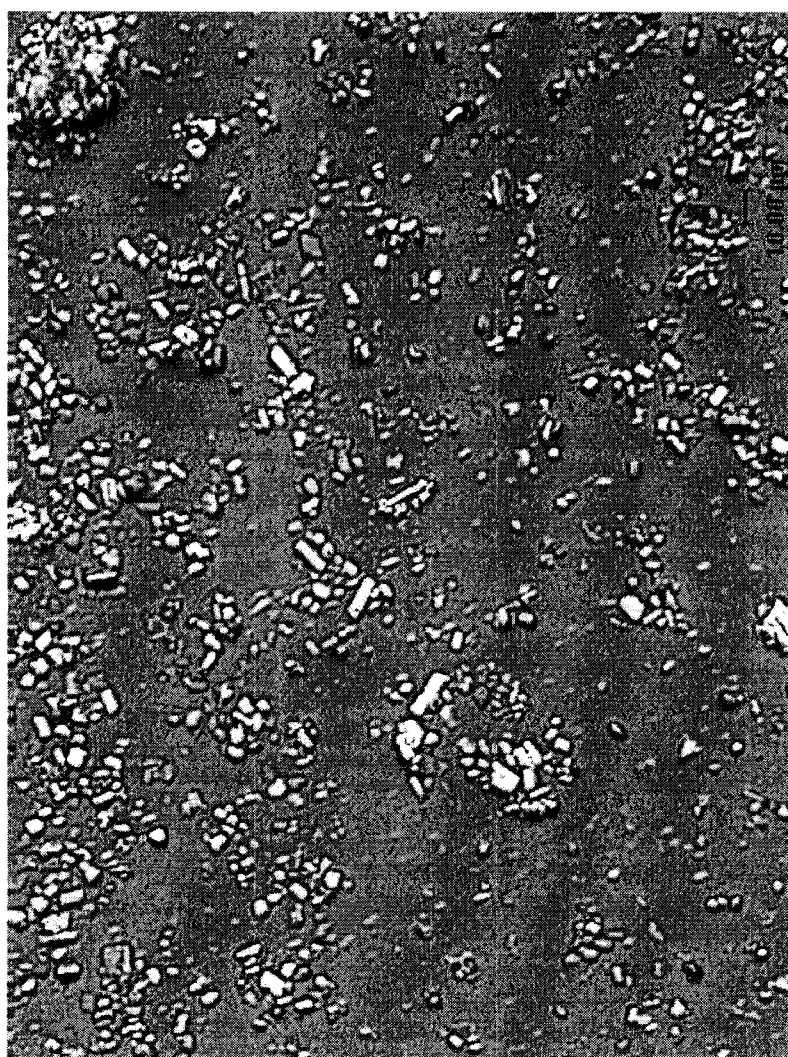


Fig 16 Example 5:

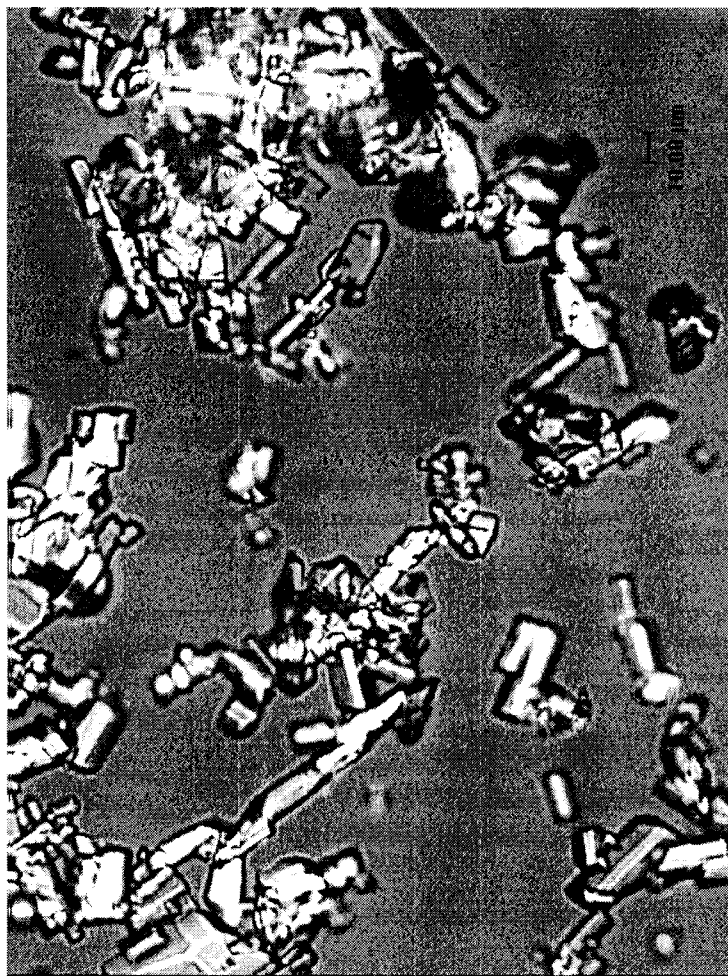


Fig 17 Example 8A



Fig 18 Example 8B

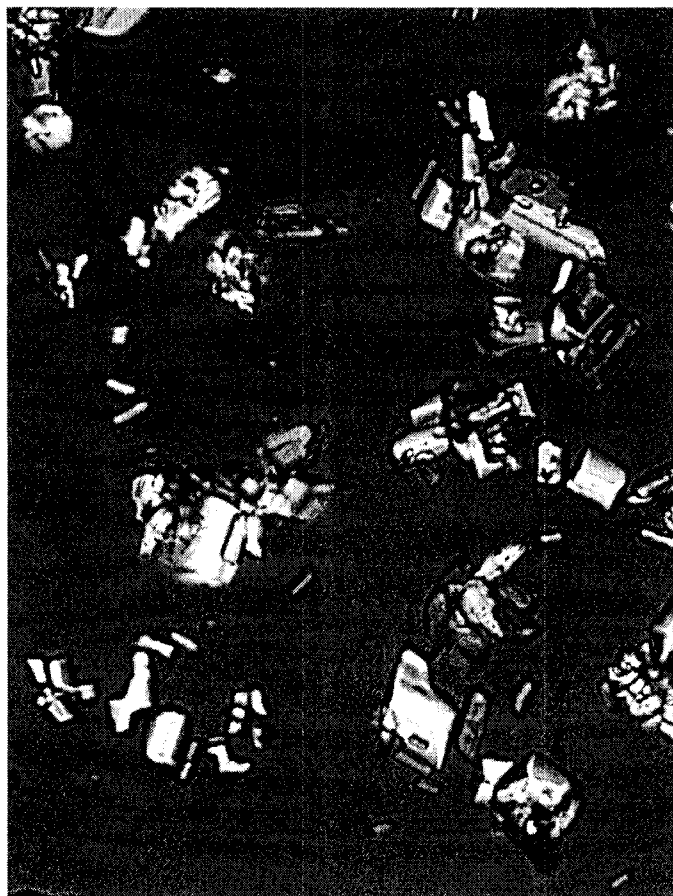


Fig 19: Example 9A

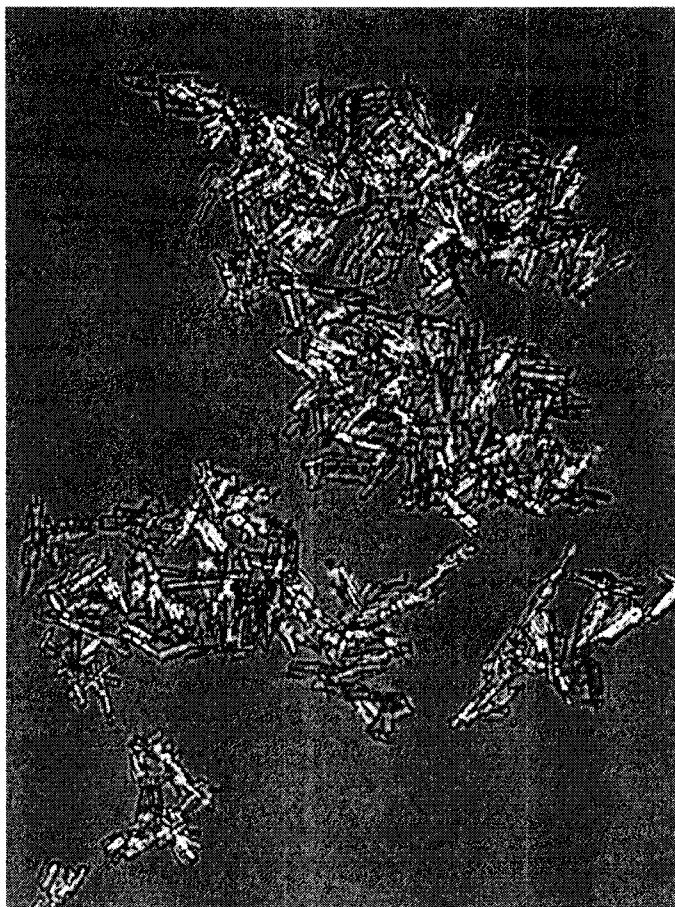


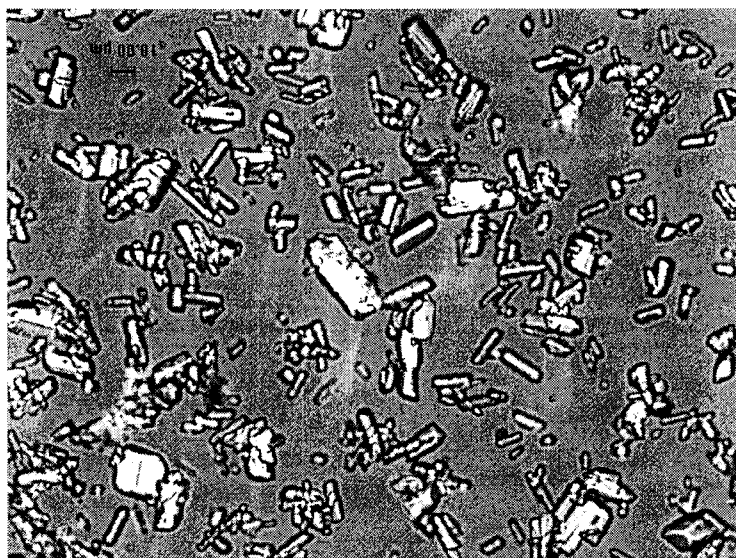
Fig 20: Example 9B



Fig 21: Example 10



Fig 22: Example 11



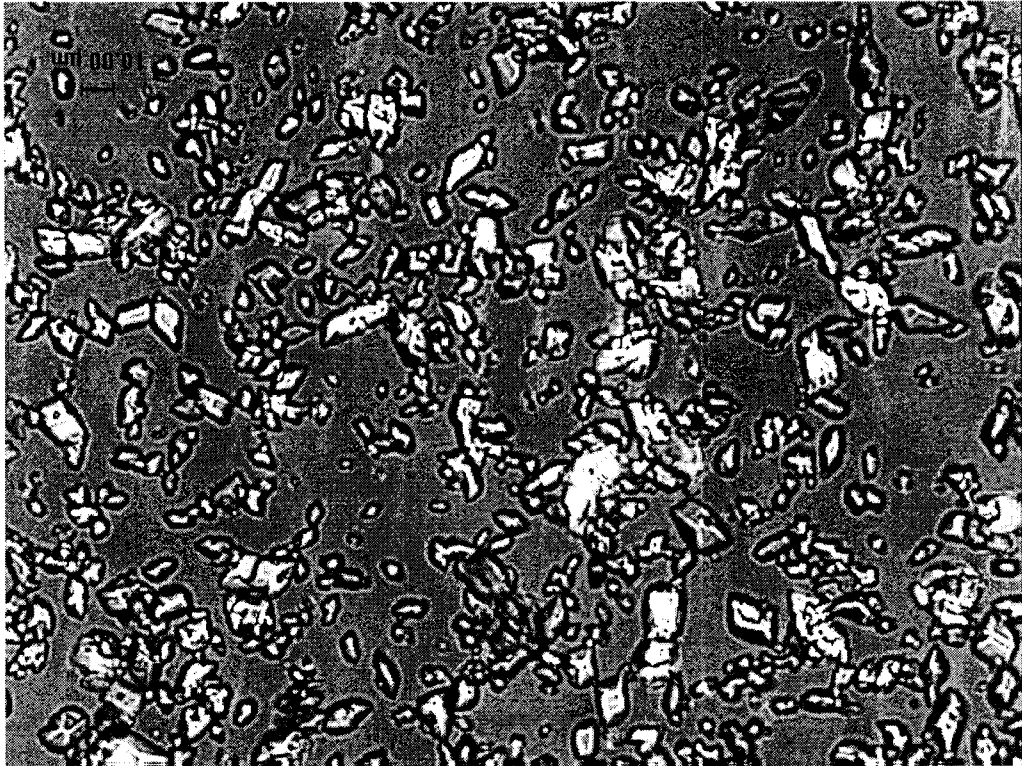


Fig 23: Example 12

Fig 24 – 15 min milling for Example 3B

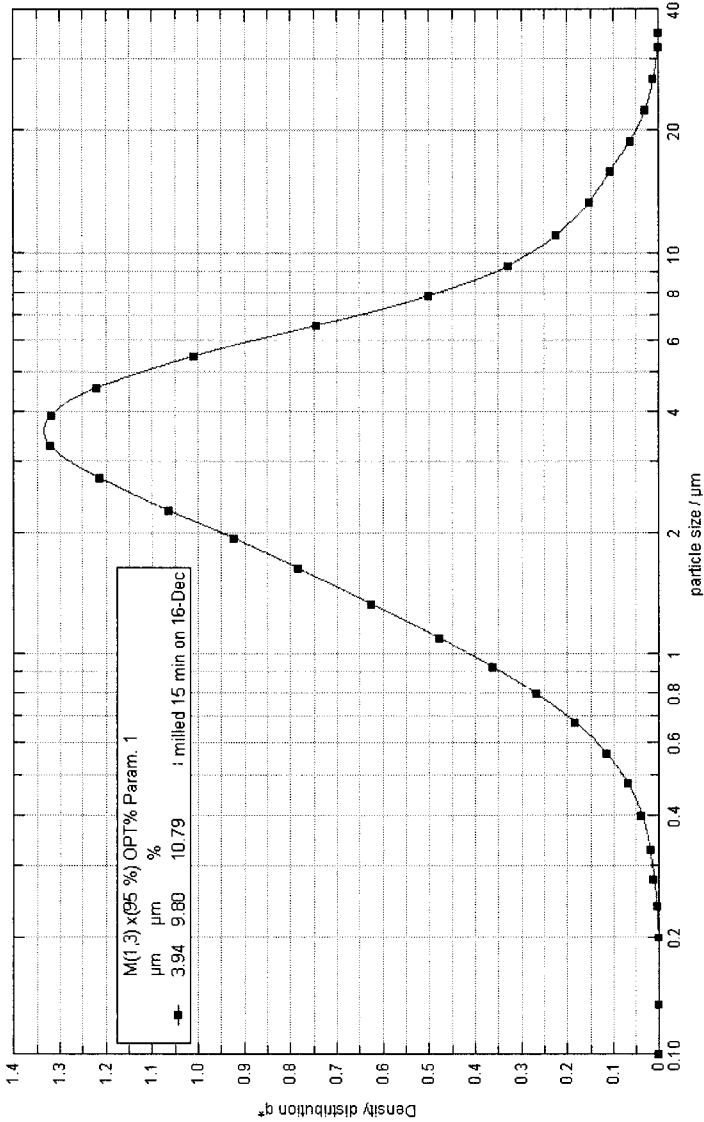


Fig 25 – 60 min milling for Example 3B

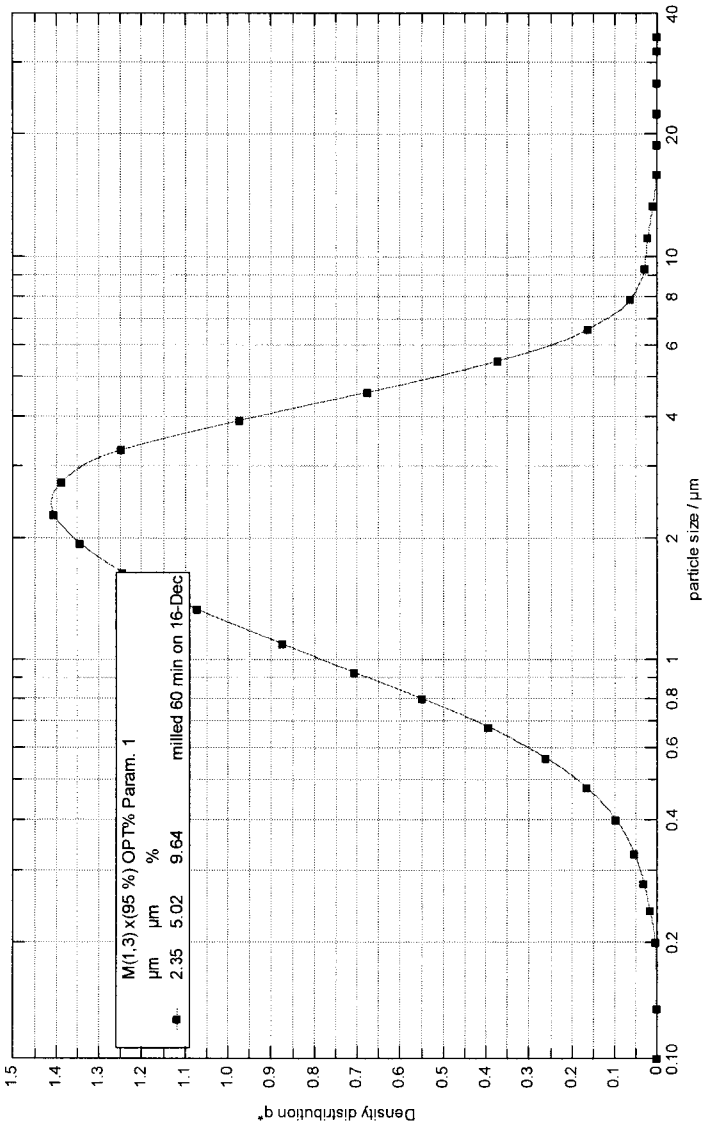


Fig 26

